We claim:

1. A method of scheduling data transmissions between a base station and a plurality of user terminal traffic streams in a wireless QoS network, comprising:

transmitting a first poll from said base station to a first user terminal traffic stream;

transmitting a first frame from said first user terminal traffic stream to said base station in response to said first poll, wherein a queue state of said first user terminal traffic stream is indicated in a header of said first frame;

removing said first user terminal traffic stream from an active list when said first frame indicates that said queue state is empty;

calculating a deferral window;

scheduling transmissions of data frames between said base station and said plurality of user terminal traffic streams that remain on said active list; and

returning said first user terminal traffic stream to said active list at the expiration of said deferral window.

2. The method of claim 1, wherein said deferral window is calculated using an algorithm based on the following equation:

$$T_D = \begin{cases} T_i, & L_i/\rho_i \geq T_{db} \\ T_s, & otherwise \end{cases} \quad \textbf{(1)}$$

where T_i is an interval selected by a deferral window adaptation algorithm, T_{db} is a requested delay bound, L_i is a nominal data frame size, ρ_i is a mean data transfer rate, T_s is a scheduling window, and T_D is the duration of said deferral window.

3. The method of claim 2, wherein T_i is calculated using an

algorithm based on the following equation:

$$T_i = T_i - (T_w - T_Q) + \sigma$$

where T_w is the average time between a first in line data frame arrival point in a user terminal traffic stream queue and the arrival of a first poll since a previous return of said user terminal traffic stream to said active list, T_Q is the average time between the return of said user terminal traffic stream to said active list and the scheduled transmission of a next poll, and σ is a heuristic factor based on the inter-arrival period variance of an uplink traffic stream.

4. The method of claim 1, wherein said deferral window is calculated based on a defined inter-arrival period of a user terminal traffic stream.

5. The method of claim 4, wherein said inter-arrival period corresponds to a period between voice or video data frames generated by a codec.

6. The method of claim 1, wherein said step of scheduling transmission of other data frames between said base station and said plurality of user terminal traffic streams that remain on said active list includes calculating individual traffic stream delays based on the elapsed time since the most recent channel access opportunity of each user terminal traffic stream in said plurality of user terminal traffic streams.

7. The method of claim 1, wherein said step of scheduling transmissions of other data frames between said base station and said plurality of user terminal traffic streams that remain on said active list is performed based on agreed to Quality of Service (QoS requirements.

8. A system of scheduling data transmissions comprising:

a plurality of user terminal traffic streams; and

a base station, wherein said base station is operable to:

transmit a first poll to a first user terminal traffic stream selected from said plurality of user terminal traffic streams;

receive a first frame from said first user terminal traffic stream in response to said first poll, wherein a queue state of said first user terminal traffic stream is indicated in a header of said first frame;

remove said first user terminal traffic stream from an active list when said first frame indicates that said queue state is empty;

calculate a deferral window;

schedule transmissions of data frames between said base station and said plurality of user terminal traffic streams that remain on said active list; and

return said first user terminal traffic stream to said active list at the expiration of said deferral window.

9. The system of claim 8, wherein said deferral window is calculated using an algorithm based on the following equation:

$$T_D = \begin{cases} T_i, & L_i/\rho_i \geq T_{db} \\ T_s, & otherwise \end{cases} \quad \textbf{(1)}$$

where T_i is an interval selected by a deferral window adaptation algorithm, T_{db} is a requested delay bound, L_i is a nominal data frame size, ρ_i is a mean data transfer rate, T_s is a scheduling window, and T_D is the duration of said deferral window.

10. The system of claim 9, wherein T_i is calculated using an algorithm based on the following equation:

$$T_i = T_i - (T_W - T_Q) + \sigma$$

where T_W is the average time between a first in line data

frame arrival point in a user terminal traffic stream queue and the arrival of a first poll since a previous return of said user terminal traffic stream to said active list, T_Q is the average time between the return of said user terminal traffic stream to said active list and the scheduled transmission of a next poll, and σ is a heuristic factor based on the inter-arrival period variance of an uplink traffic stream.

11. The system of claim 8, wherein said deferral window is calculated based on a defined inter-arrival period of a user terminal traffic stream.

12. The system of claim 11, wherein said inter-arrival period corresponds to a period between voice or video data frames generated by a codec.

13. The system of claim 8, wherein said scheduled transmissions of other data frames between said base station and said plurality of user terminal traffic streams that remain on said active list are determined by calculating individual traffic stream delays from said plurality of user terminal traffic streams based on the elapsed time since the most recent channel access opportunity of each user terminal traffic stream in said plurality of user terminal traffic streams.

14. The system of claim 8, wherein said scheduled transmissions of other data frames between said base station and said plurality of user terminal traffic streams that remain on said active list is performed based on agreed to Quality of Service (QoS) requirements.

15. A system of scheduling data transmissions comprising:
a plurality of user terminal traffic streams;
a base station;

means for transmitting a first poll from said base station to a first user terminal traffic stream selected among said plurality of user terminal traffic streams;

means for transmitting a first frame from said first user terminal traffic stream to said base station in response to said first poll;

means for removing said first user terminal traffic stream from an active list when said first frame indicates that said queue state is empty;

means for calculating a deferral window using an algorithm based on the following equation:

$$T_D = \begin{cases} T_i, & L_i/\rho_i \geq T_{db} \\ T_s, & otherwise \end{cases} \quad \textbf{(1)}$$

where T_i is an interval selected by a deferral window adaptation algorithm, T_{db} is a requested delay bound, L_i is a nominal data frame size, ρ_i is a mean data transfer rate, T_s is a scheduling window, and T_D is the duration of said deferral window.;

means for scheduling transmissions of data frames between said base station and said plurality of user terminal traffic streams that remain on said active list; and

means for returning said first user terminal traffic stream to said active list at the expiration of said deferral window.

16. The system of claim 15, wherein T_i is calculated using an algorithm based on the following equation:

$$T_i = T_i - (T_W - T_Q) + \sigma$$

where T_W is the average time between a first in line data frame arrival point in the user terminal traffic stream queue and the arrival of a first poll since a previous return of said user terminal traffic stream to said active list, T_Q is the average time between the

return of said user terminal traffic stream to said active list and the scheduled transmission of a next poll, and σ is a heuristic factor based on the inter-arrival period variance of an uplink traffic stream.

17. The system of claim 15, wherein said means for scheduling transmissions of other data frames between said base station and said plurality of user terminal traffic streams that remain on said active list calculates individual traffic stream delays from said plurality of user terminal traffic streams based on the elapsed time since the most recent channel access opportunity of each user terminal traffic stream in said plurality of user terminal traffic streams.

18. The system of claim 15, wherein said means for scheduling transmissions of other data frames between said base station and said plurality of user terminal traffic streams that remain on said active list is performed based on agreed to Quality of Service (QoS) requirements.